July 26, 2011

Dear FCC,

This letter contains our comments to the LightSquared Recommendations:

LightSquared has proposed the following three recommendations to address the problems found by the TWG in their proposed network design:

1. "operate at lower power than permitted by its existing FCC authorization;"
2. "agree to a "standstill" in the terrestrial use of its Upper 10 MHz frequencies immediately adjacent to the GPS;"
3. "commence terrestrial commercial operations only on the lower 10 MHz portion of its spectrum and to coordinate and share the cost of underwriting a workable solution for the small number of legacy precision measurement devices that may be at risk."

Comments on LightSquared's Recommendations:

(1) "operate at lower power than permitted by its existing FCC authorization"

A much lower power would need to be used. The Final Report test results[1] from tests using only the lower 10MHz signal showed that 50% of High Performance receivers were affected when the received power levels of the LightSquared transmission exceeded -43dBm as measured at the antenna of the receiver. Assuming a Free-Space propagation model, this power level would occur at around 4km radius from a Cell Tower radiating +35dBW. A decrease of 3dB broadcast power would result in the 50% "dead zone" radius reduced to around 2km. LightSquared are planning for a network of Cell Towers spaced approximately 1km from each other. This would provide a maximum radial distance achievable, within the network to the closest Cell Tower of around 500m. The expected received power in this network will be way above this susceptibility point.

In order for 50% of the High Precision Receivers tested to operate to within 50 m of a cell tower utilizing only the lower 10MHz signal, the broadcast power would have to be less than -3 dBW. Considering that LightSquared is authorized to broadcast at up to +42dBW per sector, this would represent a level 45 dB (32,000 times) less than that power!

[1] TWG Final Report 6/30/2011 Table 10, Page 243

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(2) "agree to a "standstill" in the terrestrial use of its Upper 10 MHz frequencies immediately adjacent to the GPS band"

Just a "standstill" is not good enough. Any high power terrestrial broadcast in frequency bands near GPS is a problem. LightSquared should be prohibited from ever using the Upper 10MHz of frequency or other frequencies near GPS until this problem is resolved.

(3) "Commence terrestrial commercial operations only on the lower 10 MHz portion of its spectrum and to coordinate and share the cost of underwriting a workable solution for the small number of legacy precision measurement devices that may be at risk."

The use of the Lower 10MHz frequencies is a problem for hundreds of thousands of Wide Band Precision Receivers. It will render these receivers un-usable or worse un-reliable in these areas. LightSquared should not be permitted to commence terrestrial operations using this signal until this problem is resolved.

We do not agree with broadcast in the lower 10MHz portion of this spectrum. The majority of our product line services the High Precision GPS industry. Our receivers require the full broadcast bandwidth of the GPS spectrum in order to provide the accuracies that our customers expect from our product as well as provide positioning services from other GNSS orbiting constellations including GLONASS, Galileo, and Compass. Our current product line and all of our legacy fielded equipment would be detrimentally affected and would be rendered inoperative within the service area of LightSquared's Network if this rollout should proceed.

We do not agree with the statement "small number of legacy precision measurement devices that may be at risk". We believe that ALL High Precision GPS and other GNSS receivers are at risk. This includes past (fielded), present (product for sale today) and future (all future designs). Other than finding a different frequency band away from the GNSS spectrums for LightSquared, we do not believe that there is a workable solution to this problem.

General Comments

In addition to the requested feedback on the three LightSquared recommendations, we would like convey to the FCC the impact to our business and industry if it accepts the LightSquared recommendations. Approximately 40-50% of NovAtel's overall business involves providing high-precision GNSS receivers to US-based customers. All of this business would be put at risk and would likely disappear if LightSquared is permitted to roll-out their network in the proposed L1 frequency band. With this level of impact on our revenue, it is unlikely that NovAtel could survive as a viable company.

However, what would be even more devastating is that the LightSquared Network as planned would essentially eliminate the High-Precision GNSS industry - and the impact on the US economy would be catastrophic. Entire industries, such as precision agriculture, depend on highly accurate position data made possible by high-precision GNSS receivers, like the ones

that NovAtel provides. The phenomenal productivity improvements and benefits are well documented, such as these benefits listed on the US government official GPS website[2]:

- *Precision soil sampling, data collection, and data analysis, enable localized variation of chemical applications and planting density to suit specific areas of the field.*
- *Accurate field navigation minimizes redundant applications and skipped areas, and enables maximum ground coverage in the shortest possible time.*
- *Ability to work through low visibility field conditions such as rain, dust, fog and darkness increases productivity.*
- *Accurately monitored yield data enables future site-specific field preparation.*
- *Elimination of the need for human "flaggers" increases spray efficiency and minimizes over-spray.*

There would be similar catastrophic impact on industries such as survey & mapping, machine control, aviation, unmanned airborne vehicles - to name just a few. Our customers need, robust, reliable positioning with accuracies of less than 0.5 inches. There is simply no way of doing this today without wide-band GNSS high-precision receivers, which would all be inoperable in a post LightSquared deployment.

We strongly recommend to the FCC to not approve this proposed use of the L1 spectrum, but to find a frequency for LightSquared further away from the GPS L1 frequency bands so that the LightSquared high-power application can co-exist with the GPS low-power environment.

Yours Truly,

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[2] http://www.gps.gov/applications/agriculture/